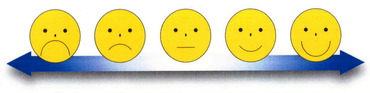


Children use a dispositional core concept when identifying causality in non-mechanical events

Sufi Abbaspour, Julia Schneider, Corinna Martarelli, Trix Cacchione
University of Berne, Switzerland, contact: sufi.abbaspour@psy.unibe.ch

THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

- Children have sophisticated pre-school theories of causality
  - E.g., dispositional theories: causation is an interaction between agents and patients endowed with intrinsic dispositions[1]
  - Asymmetric role distribution of cause- and effect-object[2]
- Research found that these theories are resistant to change[3]
- Following White's (2013)[4] study, we chose seven events, rated as low to highly causal, based on the number of prototypical features it contains
  - More causal features -> higher likelihood of causal rating

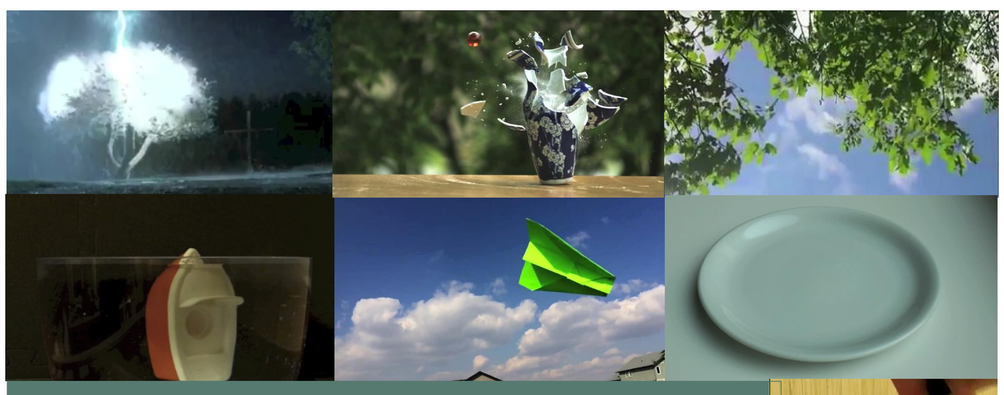
Current study:

- **Seven videos**: 3 with many features, 2 with medium number of features and 2 with few features
- **Statements** containing basic physical errors and fundamental ontological errors
- Half of the statements are **consistent** in naïve and scientific correctness, half are **inconsistent** in naïve and scientific correctness
  - If naïve theories are resistant to change, consistent statements should be answered correctly, but inconsistent statements not

Based on theoretical insights and the status quo of research, we hypothesize that:

- Events are less likely rated as causal, and with less certainty, the fewer features they contain
- Consistent statements are judged scientifically more correct than inconsistent statements
- Children answer more naïve than adults

Reference
[1]E.g., Wolff, P. (2007). Representing causation. Journal of Experimental Psychology , 136 (1), 82-111.
[2]White, P. A. (2006). The causal asymmetry. Psychological Review, 113, 132–147.
[3]Shtulman, A., Valcarel, J. (2012). Scientific knowledge suppresses but does not supplant earlier intuitions. Cognition, 124, 209-215.
[3]White, P. A. (2013). Singular clues to causality and their use in human causal judgement. Cognitive Science, 38 (1), 38-75.



Sample statements		
	Physical error	Ontological error
Consistent	The lightning excerts force	The tree wins and the lightning loses
Inconsistent	The tree excerts force	The lightning wins and the tree loses

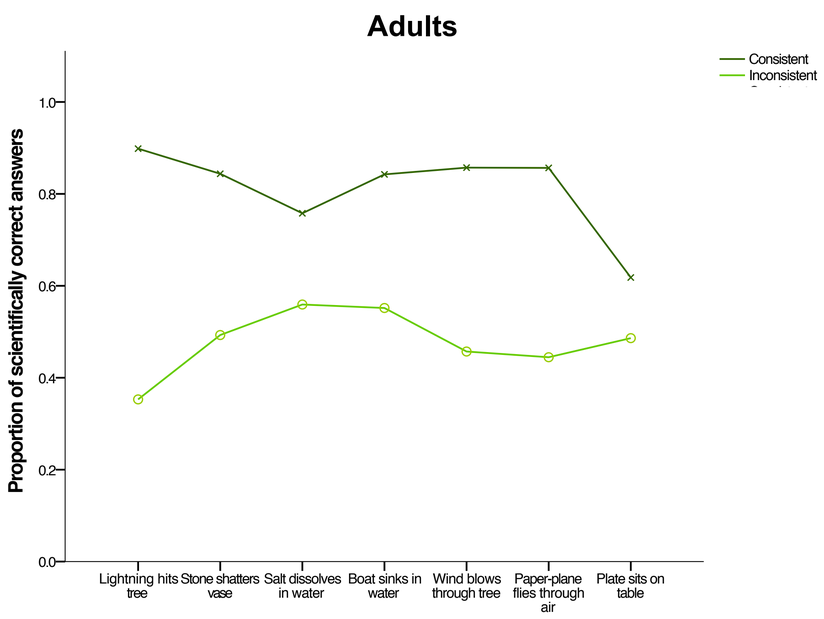
* Scientifically correct * Scientifically incorrect

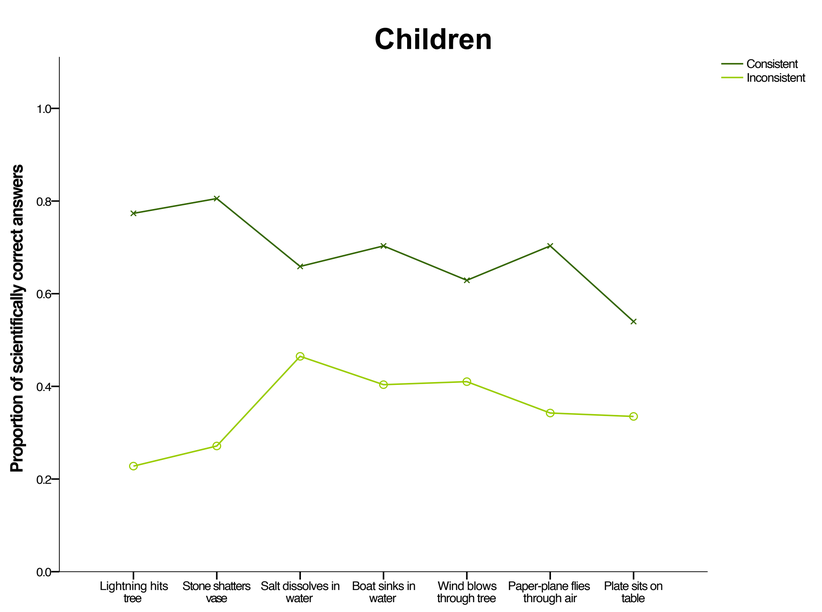
METHODS

Study description:

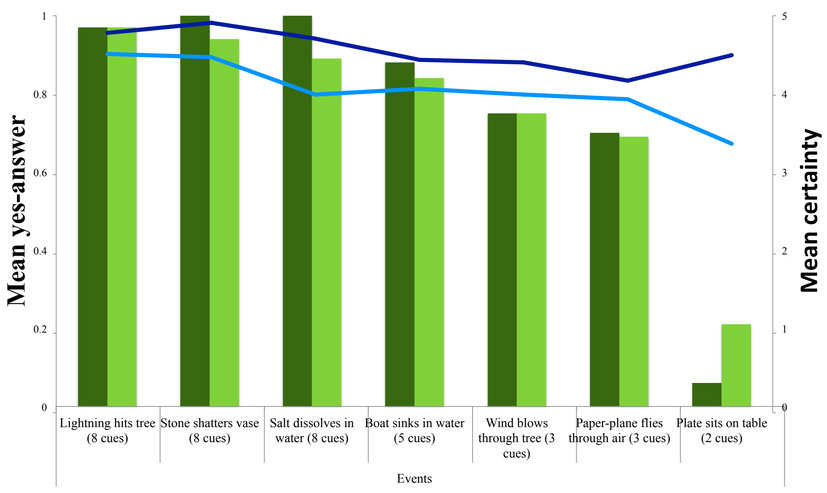
- A sample of 239 children (mean age = 7.9, *SD* = 0.6; 113 male and 126 female) and 228 adults (mean age = 25.6, *SD* = 7.3; 116 male and 112 female) were tested
- Participants were randomly divided into 7 groups, each presented with one natural event
- Children were first trained on the meaning of the word causality
- They heard a series of 18 – 24 statements (only statements that contextually apply to the event were used)
- Participants were asked if the event was causal or not

RESULTS





- Significant difference between adults/children and consistent/inconsistent for all events
- Interaction significant for "Stone shatters vase" and "wind blows through tree"
  - "Stone shatters vase": adults/children differ in inconsistent, but not consistent statements
  - "Wind blows through tree": adults/children differ in consistent, but not inconsistent statements
- Answers to inconsistent statements differ between the following events:
  - "Lightning hits tree" from all other events ($p < .05$)
  - "Salt dissolves in water" from "Stone shatters vase", "Paper-plane flies through air" and "Plate sits on table" ($p < .05$)
- Correlation between number of cues and the difference: consistent – inconsistent statements:
  - Adults: $r(228) = .118$, $p = .076$
  - Children: $r(239) = .257$, $p < .001$



- Correlation between number of cues and:
  - causal judgement: adults: $r(223) = .574$, $p < .001$; children: $r(237) = .475$, $p < .001$
  - Confidence: adults: $r(223) = .254$, $p < .001$; children: $r(232) = .279$, $p < .001$

DISCUSSION

- Adults and children experience *greater cognitive conflict* in statements whose truth value differs between the naïve and scientific theory (*inconsistent statements*)
- *Children* experience higher cognitive conflict in a *near-prototypical mechanical event*
- *Children* answer less systematically in an event with an *invisible, unbound agent* (wind)
- The *more cues* in an event, the *bigger the difference* between consistent and inconsistent statements, the *more systematically* according to the *naïve theory* participants judge it
- The *more cues* in an event, the *more* likely it is viewed as *causal* and the *more confident* participants are

This study implies that adults and children judge non-mechanical events according to naïve concepts. Education and experience is not able to supplant, but only suppresses these naïve theories.

ISSBD 24th Biennial Meeting of the International Society for the Study of Behavioural Development, Vilnius, Lithuania, July 10-14, 2016

Swiss National Science Foundation